
Space Weather Forecast

Issued on Sunday, 13 March 2022 at 13:13 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: CME arrival on 13th with G1/Minor geomagnetic storms expected and a Chance of G2/Moderate storm on Days 1 and 2 (13th-14th). Reducing Chance of further M-Class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with some low level common class flares observed, although the largest flare was from a region of an old sunspot, rather than any of the five sunspot regions on the disc. The largest of these, a bipolar string of small spots in the northeast disc has shown development but remains relatively stable. The other large region in the southwest, with the largest individual spot, is showing little sign of flare activity. Other regions are generally small, and with one region soon rotating off the Earth-facing disc. No Earth directed coronal mass ejections (CMEs) have been observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: Background solar wind speeds become elevated with the arrival of a CME at 13/1014 UTC, with solar winds peaking at 560km/s. This was accompanied by the weak magnetic field becoming strong, Although initially strongly positive (northward) in the important Bz direction, this soon rotated to be moderately negative (southward). Geomagnetic activity was initially quiet (Kp 0-2), but was Active (Kp4) 13/0900-1200 UTC

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be mainly Low, perhaps Moderate, with a chance of Moderate-class flares. The risk of Moderate-class flares mainly comes from the regions in the southwest and northeast, with the risk reducing slightly through Days 2 and 3 (14-15 Mar) as the southwestern region rotates off the disc.

Solar Wind / Geomagnetic Activity: Ongoing CME effects are expected day 1(13th) and likely early day 2 (14th), with G1/Minor Geomagnetic Storms expected and a chance of G2/Moderate geomagnetic storms. Once Earth exits the trailing portion of the CME day 2 (14th), solar winds are expected to gradually ease to background levels, with no further enhancements expected. Geomagnetic activity will then gradually return to largely Quiet with isolated Unsettled intervals Days 3 and 4 (15th and 16th).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to be at background with no solar radiation storms occurring. Although there is very slight chance of this increasing in response to any flares that occur.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	80	60	1	1
Strong	G3	No	10	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	25	20	15	15
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)